

WHAT IS CLAIMED IS:

1. An antenna device comprising:
  - a ground conductor;
  - 5 a first dielectric substrate placed upright on the ground conductor;
  - a first radiating conductor and a second radiating conductor that meander and are symmetrically disposed on a surface of the first dielectric substrate, lower ends of the
  - 10 first radiating conductor and the second radiating conductor being connected at a junction; and
  - a capacitive conductor disposed on the first dielectric substrate and connected to upper ends of the first radiating conductor and the second radiating conductor.
- 15 2. An antenna device according to claim 1, further comprising a third radiating conductor disposed on the surface of the first dielectric substrate between the first radiating conductor and the second radiating conductor and
- 20 extending in a straight line along an axis around which the first radiating conductor and the second radiating conductor are symmetrically disposed, the third radiating conductor capacitively coupled with the junction and configured to
- 25 resonate at a higher frequency than the first and second radiating conductors.
3. An antenna device according to claim 2, wherein an upper end of the third radiating conductor is connected to

the capacitive conductor.

4. An antenna device according to claim 1, further comprising a second dielectric substrate disposed on the  
5 first dielectric substrate, a conductive layer forming the capacitive conductor disposed on a surface of the second dielectric substrate.

5. An antenna device according to claim 4, wherein the  
10 second dielectric substrate is disposed substantially parallel to the ground conductor.

6. An antenna device according to claim 5, wherein a  
15 first surface of the second dielectric substrate contacts the first dielectric substrate and the conductive layer is disposed on a second surface of the second dielectric substrate opposing the first dielectric substrate.

7. An antenna device according to claim 6, wherein the  
20 conductive layer is connected to the first and second radiating conductors via through holes.

8. An antenna device according to claim 1, wherein the  
25 capacitive conductor is a solid conductive plate.

9. An antenna device according to claim 8, wherein the  
conductive plate is disposed on an end of the first dielectric substrate and is substantially parallel to the

ground conductor.

10. An antenna device according to claim 1, wherein the capacitive conductor is disposed substantially parallel to  
5 the ground conductor.

11. An antenna device according to claim 2, further comprising a power supply connected between the ground conductor and the junction, the power supply supplying high-  
10 frequency power to the junction to resonate at least one of the first and second radiating conductors and the third radiating conductor, the first and second radiating conductors radiating at substantially the same frequency.

15 12. An antenna device according to claim 1, further comprising a third radiating conductor disposed on a straight line along an axis around which the first radiating conductor and the second radiating conductor are symmetrically disposed, the third radiating conductor  
20 capacitively coupled with the junction and configured to resonate at a higher frequency than the first and second radiating conductors.

13. An antenna device according to claim 12, wherein an  
25 upper end of the third radiating conductor is connected to the capacitive conductor.

14. An antenna device according to claim 12, further

comprising a power supply connected between the ground  
conductor and the junction, the power supply supplying high-  
frequency power to the junction to resonate at least one of  
the first and second radiating conductors and the third  
5 radiating conductor, the first and second radiating  
conductors radiating at substantially the same frequency.

15. An antenna device comprising:  
a ground conductor;  
10 a first dielectric substrate disposed on the ground  
conductor;  
a first set of radiating conductors disposed on a  
surface of the first dielectric substrate, the first set of  
the radiating conductors directly connected to the ground  
15 conductor and disposed to provide an area on the surface of  
the first dielectric substrate where electric fields  
generated by the first set of the radiating conductors  
cancel each other out; and  
a capacitive conductor disposed on the first dielectric  
20 substrate and connected to the first set of the radiating  
conductors.

16. An antenna device according to claim 15, wherein  
the first set of the radiating conductors are connected  
25 together at a connection point such that a distance from the  
connection point in a particular radiating conductor in the  
first set of the radiating conductors to a ground connection  
where the particular radiating conductor contacts the ground

conductor is the same as the distance in the other radiating conductors in the first set of the radiating conductors.

17. An antenna device according to claim 16, wherein  
5 ends of the radiating conductors in the first set of the radiating conductors are connected together.

18. An antenna device according to claim 15, wherein  
the radiating conductors in the first set of radiating  
10 conductors contain meandering lines.

19. An antenna device according to claim 15, further  
comprising a second dielectric substrate disposed on the  
first dielectric substrate, a conductive layer forming the  
15 capacitive conductor disposed on a surface of the second dielectric substrate.

20. An antenna device according to claim 19, wherein  
the second dielectric substrate is disposed substantially  
20 parallel to the ground conductor.

21. An antenna device according to claim 20, wherein a  
first surface of the second dielectric substrate contacts  
the first dielectric substrate and the conductive layer is  
25 disposed on a second surface of the second dielectric substrate opposing the first dielectric substrate.

22. An antenna device according to claim 21, wherein

the conductive layer is connected to the first set of radiating conductors via through holes.

23. An antenna device according to claim 15, wherein  
5 the capacitive conductor is a solid conductive plate.

24. An antenna device according to claim 23, wherein  
the conductive plate is disposed on an end of the first  
dielectric substrate and is substantially parallel to the  
10 ground conductor.

25. An antenna device according to claim 15, further  
comprising at least one radiating conductor disposed in the  
area on the surface of the first dielectric substrate where  
15 electric fields generated by the first set of the radiating  
conductors cancel each other out, the at least one radiating  
conductor configured to resonate at a higher frequency than  
the conductors in the first set of radiating conductors.

20 26. An antenna device according to claim 25, wherein  
the radiating conductors in the first set of radiating  
conductors contain meandering lines and the at least one  
radiating conductor is straight.

25 27. An antenna device according to claim 26, wherein  
the at least one radiating conductor is disposed along an  
axis around which the first set of radiating conductors are  
symmetrically disposed.

28. An antenna device according to claim 25, wherein the at least one radiating conductor is capacitively coupled the first set of radiating conductors.

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29. An antenna device according to claim 28, wherein the at least one radiating conductor is capacitively coupled the first set of radiating conductors at a connection point connecting the radiating conductors in the first set of radiating conductors.

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30. An antenna device according to claim 28, wherein the at least one radiating conductor is connected to the capacitive conductor.

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31. An antenna device according to claim 25, further comprising a power supply connected between the ground conductor and the first set of radiating conductors, the power supply supplying high-frequency power to the first set of radiating conductors to resonate at least one of the first set of radiating conductors and the at least one radiating conductor.

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32. A method of fabricating an antenna device, the method comprising:

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providing a ground conductor;

attaching a first dielectric substrate to the ground conductor such that a first set of radiating conductors

disposed on a surface of the first dielectric substrate directly contact the ground conductor, the first set of radiating conductors disposed to provide an area on the surface of the first dielectric substrate where electric  
5 fields generated by the first set of the radiating conductors cancel each other out; and

attaching a capacitive conductor to the first dielectric substrate such that the first set of the radiating conductors are in electrical contact with the capacitive  
10 conductor.

33. A method according to claim 32, further comprising forming the first set of radiating conductors on the surface of the first dielectric substrate.

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34. A method according to claim 32, wherein the radiating conductors in the first set of radiating conductors contain meandering lines and ends of the radiating conductors in the first set of the radiating  
20 conductors are connected together.

35. A method according to claim 32, further comprising attaching a second dielectric substrate on the first dielectric substrate such that the second dielectric  
25 substrate is disposed substantially parallel to the ground conductor, a conductive layer forming the capacitive conductor disposed on a surface of the second dielectric substrate.



36. A method according to claim 32, wherein the capacitive conductor is a solid conductive plate.

5        37. A method according to claim 32, wherein the conductive plate is disposed on an end of the first dielectric substrate and is substantially parallel to the ground conductor.

10       38. A method according to claim 32, further comprising at least one radiating conductor disposed in the area on the surface of the first dielectric substrate where electric fields generated by the first set of the radiating conductors cancel each other out, the at least one radiating  
15 conductor configured to resonate at a higher frequency than the conductors in the first set of radiating conductors.

39. A method according to claim 38, wherein the radiating conductors in the first set of radiating  
20 conductors contain meandering lines, ends of the radiating conductors in the first set of the radiating conductors are connected together, and the at least one radiating conductor is straight.

25       40. A method according to claim 39, wherein the at least one radiating conductor is disposed along an axis around which the first set of radiating conductors are symmetrically disposed.

41. A method according to claim 38, wherein the at least one radiating conductor is capacitively coupled the first set of radiating conductors at a connection point  
5 connecting the radiating conductors in the first set of radiating conductors.

42. A method according to claim 38, further comprising attaching the capacitive conductor to the first dielectric  
10 substrate such that the at least one radiating conductor electrically contacts the capacitive conductor.

43. A method according to claim 39, further comprising supplying high-frequency power to the ends of the first set  
15 of radiating conductors to resonate at least one of the first set of radiating conductors and the at least one radiating conductor.